

Claims

1. Mask (MM) having patterns (MF), for a lithography device operating by reflection of a beam of photons of a wavelength less than about 120 nm, comprising a planar substrate (ST) connected to a reflective structure (SMR) comprising a front face equipped with selected patterns (MF), formed from a material absorbent to the said wavelength, characterised in that it comprises protective means (SP) transparent to the said wavelength and contrived to keep interfering particles (PP) at a distance (H) from the patterns (MF) which is greater than or equal to one of two values taken from a depth of focus (doF) of the device and a height of pattern/interfering particle (h) associated with a tolerated percentage of absorption of photons by the interfering particles (PP) which is a function of their diameter (d).
2. Mask according to claim 1, characterised in that the protective means (SP) are contrived to keep the interfering particles (PP) at a distance (H) from the patterns (MF) which is greater than or equal to the two values taken by the depth of focus (doF) of the device and the height of pattern/interfering particle (h).
3. Mask according to either of claims 1 or 2, characterised in that the protective means (SP) form a structure having a maximum variation of optical thickness selected so as to bring about locally a deflection of the beam which is negligible compared to the precision of placing of the patterns (MF).
4. Mask according to one of claims 1 to 3, characterised in that the protective means (SP) form a structure which brings about substantially no phase variation between photons of the beam reflected by the mask.

5. Mask according to one of claims 1 to 4, characterised in that the protective means (SP) form a hydrophobic structure.
6. Mask according to one of claims 1 to 5, characterised in that the protective means (SP) form a structure of which at least a front face, opposite to the patterns (MF), is capable of being cleaned of some at least of the interfering particles (PP) which it holds.
7. Mask according to one of claims 1 to 6, characterised in that the protective means (SP) form a structure capable of being inspected, with a selected contrast, by means of observation means operating in the visible or ultraviolet range.
8. Mask according to one of claims 1 to 7, characterised in that the protective means (SP) form a conductive structure capable of thermophoresis.
9. Mask according to one of claims 1 to 8, characterised in that the protective means (SP) form a conductive structure capable of applying an electrostatic effect.
10. Mask according to claim 9, characterised in that the electrostatic effect is intended to repel the interfering particles (PP).
11. Mask according to one of claims 1 to 10, characterised in that the protective means (SP) form a structure which is non-diffracting and non-diffusing in the ultraviolet range.
12. Mask according to one of claims 1 to 11, characterised in that the distance (H) is between about 50 nm and about 5000 nm.

13. Mask according to one of claims 1 to 12, characterised in that the protective means (SP) form a structure placed on the front face of the reflective structure and parallel thereto, and comprising at least one antireflective layer of a selected material.
14. Mask according to one of claims 1 to 12, characterised in that the protective means (SP) form a structure composed of a foam of a selected material.
15. Mask according to one of claims 1 to 12, characterised in that the protective means (SP) form a structure formed from a selected material, placed on the front face of the reflective structure (SMR) and defining channels (CX) making it possible to reduce the density of the material.
16. Mask according to one of claims 1 to 12, characterised in that the protective means (SP) form a structure having a membrane (ME) connected by pillars (PS) to the front face of the reflective structure, and in a position substantially parallel to the front face, the thickness of the membrane (ME) and the height of the pillars (PS) being such that their sum is equal to the selected distance (H).
17. Mask according to one of claims 1 to 12, characterised in that the protective means (PS) form a structure composed of nanotubes oriented in a selected direction relative to the normal (N) to the front face of the reflective structure (SMR).
18. Mask according to one of claims 13 to 17, characterised in that the material is selected from at least the polymers transparent to the said wavelength, carbon, carbon nanotubes, silicon, beryllium, ruthenium, silver or zirconium.